

REMARKS

This amendment is responsive to the non-final Office Action dated October 4, 2007. Claims 1 - 14 are pending in this application and have been rejected. Claim 7 is rewritten in independent form and claims 9 and 11 are canceled.

These remarks follow the order of the outstanding Office Action beginning at page 2 thereof.

JP 2001-114519

Claims 1 - 6, 9 - 10 and 14 have been rejected as being anticipated by, or in the alternative under 35 USC § 103 as obvious over '519. This rejection of former claim 3 (now claim 1) is respectfully traversed for the reasons that follow.

Applicant wishes to thank the examiner for identification of the Japanese web site that provides machine translations of Japanese applications. The '519 application is identified as JP, 2001-114519, A. Since the translation of JP '519 is not of record, applicant includes with this amendment a copy of the parts downloaded by the undersigned.

In applicant's claims 1 - 2 and 4 - 5 applicant claims a spherical shaped porous titanium oxide powder. Similarly, in claims 6 - 12, applicant claims methods of manufacturing a spherical shaped porous titanium oxide powder. On the other

hand, JP '519 manufactures a porous fibrous titanium or a fiber ([0046], last 2 lines), line immediately above [0033]) (prior art, line 4) ([0045] line 1) ([0061], line 1). The fibrous product of JP '519 is produced by a spinning process ([0023], line 1 and line 3). There is no discussion in JP'519 of any other shape, such as a powder having a diameter (all claims) or spherical claim 1 (former claim 3). In claim 1, applicant requires that the powder be approximately spherical in shape. In JP'519 there is never any discussion of a powder or a spherical shape.

In applicant's disclosed invention, the spherical shape of the particles is shown in Figures 1 and 2, the table (Figure 1 at page 17) and discussed at pages 4, 13, 18 and in the Abstract. Still further, the discussion at page 8, lines 8 and 9 demonstrate the importance of use of the aliphatic alcohol, which is preferable to produce a "nice shape." The nice shape is the spherical shape as described elsewhere in the specification and shown in the drawings, Figures 1 and 2. The nice shape, or spherical shape, of the porous titanium powder achievable with the aliphatic alcohol is not suggested by any prior art, and was discovered by applicant.

In claim 1 (as amended), the powder is described as having a surface area of 327 to 500 m<sup>2</sup>/g (see example 6, pages 19 and 20).

The examiner has cited the 180 m<sup>2</sup>/g limitation of claim 2 of JP '519. However, reference to Table 1 and [0046] shows that the

BET (which ranges between 100 and 81 and 200 and 82) is for a physical property of a fibrous porosity titanium (see [0046], [0045]). Only example 3 of JP'519 has a BET of 282 that is lower than the new lower limit of 327 in claims 1 - 2 and 4 - 6. However, as described in [0046], this is the fibrous porosity titanium. Still further, as pointed out in the last lines of [0046], it is the physical properties of a fibrous porosity titanium, which were obtained and shown in Table 1. This is not the powder claimed by applicant. In the other teachings of JP'519, there are no teachings of a specific surface area for a spherical shaped porous titanium oxide powder.

JP'519, therefore, does not anticipate claim 1 for two reasons. First, JP'519 has a specific surface area related to a fiber, not a powder. Secondly, JP'519 makes no mention of particle diameters at all. The reason is that in JP'519 there is no particle diameter at all, but instead, a fiber.

In claim 3 (now claim 1), applicant sets forth that the shape is approximately spherical with a ratio of the minor axis to the major axis being at least 0.75. The fibrous titanium simply cannot confirm to this claim limitation.

The examiner has relied upon the abstract as a teaching of a diameter of 10 nm. However, it is clear from the specification that the diameter referred to is the diameter of a fiber because it relates to the polymer solution and burning the polymer solution. Should the examiner be referring an anatase crystal,

this crystal is described in the abstract as having a greater than or equal to 10 m<sup>2</sup>/g BET. On the other hand, the powder claimed by applicant in claim 1 has a completely different range, which is 327 to 500 m<sup>2</sup>/g. Therefore, the abstract does not provide an anticipation of applicant's claimed spherical shaped powder having a diameter of 0.01 to 100 μm, and the powder having a specific surface area of 327 to 500 m<sup>2</sup>/g.

Claim 6, 9 - 10 and 14

Claim 9 has been canceled because it was of the same scope as claim 9.

These method claims all relate to a method of manufacturing a spherical shaped porous titanium oxide powder. As described with respect to claims 1 - 5 of '519, the material produced by JP'519 is not a powder, but a fiber.

JP'519 differs from applicant's method claims in numerous other respects. First, JP'519 uses an aliphatic alcohol (an example is isopropyl alcohol) as a solvent during manufacturing the titanium alcoxide solution. JP'519 uses an organic-titanium as a titanium source, not an inorganic titanium, such as applicant's claimed titanium salts. In applicant's claims, the aliphatic alcohol is used for the hydrolysis step of heating.

In JP'519 the examiner states that there is a calcinating of the polymer solution under presence of a fatty acid (referring to claims 6 and 7 of JP'519). However, applicant's claimed

invention (claims 6 - 14) uses an aliphatic alcohol and, more specifically, a polyhydric alcohol (claims 8, 10) that is not a fatty acid.

JP'519 is hydrolyzed by water and does not have the process of heating hydrolysis. In applicant's claimed invention, the hydrolyzing is by heating with an aliphatic alcohol (claim 6) or polyhydric alcohol as set forth in claim 6, 7, 8 and 10.

Chopin '312

In Chopin there are three different particles that are disclosed. There is a starting anatase particle that has a diameter of 50 - 70  $\mu\text{m}$  and a BET of 200  $\text{m}^2/\text{g}$  to 250 (column 4, lines 34 - 35). In order to arrive at the starting anatase, titanium dioxide seeds having a diameter of 3 nm to 8nm and preferably of 3 - 5 nm are used. The final product is a coated  $\text{TiO}$  particle having a diameter of 100 nm and a BET of only 10  $\text{m}^2/\text{g}$ .

In the outstanding Office Action, the examiner cites a specific surface area of at least 200  $\text{m}^2/\text{g}$  as recited in claim 16 of '312. This is in '312 the composition called "starting anatase titanium dioxide particles" (column 4, line 25).

In applicant's claimed methods (claims 6, 7, 8, 10, 12, 13 and 14), applicant utilizes an aliphatic alcohol. The presence of the aliphatic alcohol in applicant's claimed methods differs from Chopin, which does not use an alcohol at all in preparation

of the starting compound. The only mention of an alcohol in Chopin is not aliphatic (column 5, line 36) in the preparation of the starting compound. The other alcohol disclosure in the cosmetic composition portion of the disclosure beginning at line 1 of column 8 and continuing through the descriptions of the cosmetic compositions to which the disclosure is directed. This is not for the manufacture of a porous titanium oxide powder. In applicant's claims 8 and 10, applicant further specifies that the alcohol is a polyhydric alcohol. This hydrolization by heating in the presence of such a polyhydric alcohol is simply not disclosed at all in '312.

The importance of the aliphatic alcohol or, more specifically, the polyhydric alcohol set forth in the claim 8 as outlined above is that the aliphatic alcohol when present results in the spherical shape (applicant's specification, page 8, lines 8 - 9). On the other hand, without the presence of the aliphatic alcohol and under the presence of carboxyl groups or carbonyl groups, the particle size becomes small. There is no evidence or teaching in '312 that the particle shape is spherical. The conclusion is that '312 must be non-spherical. In accordance with applicant's claimed invention of claim 6, it is the presence of the aliphatic alcohol with the carboxyl or carbonyl group that produces the smaller, spherical shaped size. The tendency of the particle diameter of the porous powder to become lower (and, therefore, a higher BET) is taught in applicant's specification

(page 10, lines 4 - 9). Applicant at page 9, line 6 through 14, shows that it is not possible to obtain a powder having a high specific surface area (250 BET) without the aliphatic alcohol.

The examiner cites column 7, lines 1 - 7 as an example of treatment with acid conditions. However, acidic conditions are not discussed in this portion of the specification. The reference to acidic occurs in column 7, line 12 in reference to the liquid medium. However, the liquid medium is obtained once hydrolysis is has been carried out. Then the titanium dioxide obtained is recovered by separation of the precipitated smaller solid from the mother liquids before being redispersed in a liquid medium. There is nothing else in '312 that would suggest the heating treatment with an acid (claims 6, 7, 8 and claims dependent therefrom).

In the examples of '312, there is no showing of a BET size that conforms to the statement "at least 250 m<sup>2</sup>/g" found at column 4, line 35. The examples all relate to compositions that are not the starting composition, but instead are the coated titanium oxide particle. The coated titanium oxide particle, however, has a BET of only 70 m<sup>2</sup>/g (column 1, lines 35 - 41).

While '312 teaches that the starting solution intended to be hydrolyzed can be an alcohol provided in the titanium compound A and the compound B are used, then substantially soluble in the mixture (column 5, lines 33 - 37). This alcohol is not defined

as an aliphatic alcohol as in applicant's claims, or more specifically, the polyhydrate alcohol claimed. The shape is not disclosed as spherical.

Claim 7

Claim 7 directed to aliphatic alcohol was not rejected as anticipated or obvious in the outstanding Office Action. Although the disposition of claims indicates that claim 7 was rejected, claim 7 is never discussed in the detailed portion of the outstanding Office Action.

Claim 7 has been rewritten in independent form including the limitations of claim 6, but without the carboxyl group or the carbonyl group of claim 6. Claim 7 is also amended to include the spherical shaped limitation.

It is believed that the examiner in not stating a rejection for former claim 7 may have treated claim 7 as not including the carboxyl group or carbonyl group.

Claim 11

Claim 11 has been canceled because it was substantially of the same scope as claim 6.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action in accordance thereof is requested. In the event there is



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any reason why the application cannot be allowed in this current condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully submitted,



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